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ABSTRACT

Reported is a study that designed a set of materials representing a spectrum of possible opinions on an environmental issue and tested the materials with ninth-grade students. Materials were obtained regarding strip mining. Judges ranked the materials on a five point scale from strongly supporting to strongly opposing strip mining. Materials on which judges could agree were selected for the study. An experimental group and control group were involved in the instruction. Both groups were pretested and posttested. The experimental group received five days of instruction with materials reviewed by the judges. The posttest data indicated the control group students did not change their attitudes while the experimental group students did. In general, students with extreme positions tended to become less extreme. (RH)

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STUDENT ATTITUDE CHANGE AS A RESULT OF THE PRESENTATION OF MATERIALS REPRESENTING VARIOUS OPINIONS ON STRIP MINING

A Thesis

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Science

by

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1975

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	iv
LIST OF TABLES	v
Chapter	
I. THE PROBLEM	1
Introduction	1
Purpose of the Study	3
The Problem Stated	4
Definitions	4
Hypotheses (Conceptual)	5
Hypotheses (Operational)	6
Outline of the Study	6
II. REVIEW OF RELATED LITERATURE	7
Material Development	7
Attitude Change	12
III. METHODOLOGY	17
PART I - Development of the Set of Materials	17
The Panel of Judges	17
Criteria for Acceptance of Material	18
Collection of Materials	18
PART II - Researching the Problem	18
Developing the Strip Mining Attitude Scale (SMAS)	19
Method of Construction	19
Selection of Statements for the Initial Test Form	19
Administration of the Initial Test Form	20
Selection of Statements for the Final Form	21
Reliability of the Final Form	22
Validity of the Final Form	23

	Page
Design of the Study	23
Selection of Subjects	23
Instrumentation (Pretest) . . .	24
Treatment and Posttesting . . .	24
Statistical Tests	25
IV. RESULTS AND CONCLUSIONS	27
The Set of Materials	27
Testing the Hypotheses	28
Conclusions	35
Recommendations	35
REFERENCES	37
APPENDIX A	40
APPENDIX B	42
APPENDIX C	47
APPENDIX D	53
APPENDIX E	57

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T. L. W.

LIST OF TABLES

Table		Page
1.	Statements With the Highest DP's	21
2.	Paired Statements of the Half-tests	22
3.	Test of Significance on Scores of Experimental "Supporters"	30
4.	Test of Significance on Scores of Experimental "Opposers"	31
5.	Test of Significance on Scores of Control "Supporters"	33
6.	Test of Significance on Scores of Control "Opposers"	34

CHAPTER I

THE PROBLEM

Introduction

The term "environmental education" is in its infancy, so a universally accepted definition is far from being established. The U. S. Office of Education (29) has stated that environmental education is

> the educational process dealing with man's relationship with his natural and man-made surroundings, and includes the relation of population, pollution, resource allocation and depletion, conservation, transportation, technology, and urban and rural planning to the total human environment.

As Commissioner of Education, S. P. Marland, Jr. (18) specified further that

> we now see environmertal education as a new approach to learning. Even as attitudes of individual worth, free agency, democractic consent, and cooperative effort are learned subconsciously in many parts of the school curriculum, so must new attitudes of environmental concern pervade each subject, each course, and each discipline, whether mathematics, English, science, social studies, music, or whatever.

In specifically identifying goals of environmental education Roth (24) stated that this field is concerned with

> developing a citizenry that is:
> 1. Knowledgeable about the biophysical and sociocultural environments of which man is a part;
> 2. Aware of environmental problems and management alternatives of use solving those problems; and
> 3. Motivated to act responsibly in developing diverse environments that are optimum for living a quality life.

In each of the preceeding it is noted that we are talking about an approach, or, perhaps an educational process. All speak of awareness of problems and cooperation in choosing sound solutions. Environmental education is therefore concerned with developing decision-making processes based upon a full awareness of the environment and its problems.

Caldwell (2), using a political vantage point, adds that in order

> to improve the human environment, both man and politics must be improved. Men make politics; political institutions influence human behavior; and behavior is heavily influenced by attitudes, beliefs, and values. . .The quality of the future environment depends, therefore, upon the shaping of attitudes, beliefs, and values through present education.

He points out that education plays a crucial role in determining the quality of life. The statement implies that education needs to develop ways of influencing attitudes concerning the environment and the issues facing us, now and in the future.

In many cases the "answers" to environmental problems are not known, so the educational process must not close its eyes to any possible solutions. Students should be encouraged to explore these possibilities, taking advantage of opportunities to practice environmental decision-making.

Environmental education provides a model through which to present all sides of an issue and, in turn, enable students to reach their own justifiable conclusions. For this reason, it follows that classroom materials presenting all viewpoints on given environmental issues should be developed so that a complete picture of any situation or problem may be presented. By utilizing such materials to produce discussion, debate, and inquiry, the teacher can help students to gain greater insight into the specific topic at hand and, in addition, cause students to reevaluate their viewpoints, considering all alternatives before making up their minds.

Purpose of the Study

The purpose of the study is two-fold. First is the development of a set of materials representing a spectrum of possible opinions on an environmental issue. For this study the topic of strip mining was chosen since it is clearly a controversial issue and all sides can be well supported by documented material. As mentioned before, the set is designed to be used by the teacher as a miniature resource library from which to create discussion, debate, and inquiry into the subject.

With development completed, the second important portion in the study was undertaken: testing effectiveness of the materials on a sample of ninth grade students. The results of this type of experiment provides empirical information relative to attitude change and, with the development of the set of materials on strip mining, a product is created which can be utilized in the classroom.

The Problem Stated

Conceptually, the problem depicted by the experiment discussed is stated as follows:

Does the presentation of many sides of an environmental issue through a set of materials representing a spectrum of opinions significantly change the attitude of ninth grade students toward that issue?

Definitions

The following are terms for which definitions are necessary in order to maintain conceptual clarity throughout the study:

Strip Mining - the process by which the overburden of earth is removed in order to mine a mineral layer, in this case, coal.

Strip Mining Attitude Scale (SMAS) - the instrument produced as a result of this study which is used to measure a subject's position on the topic of strip mining.

Supporters of Strip Mining (SSM) - subjects who score in the upper quartile on the Strip Mining Attitude Scale.

Opposers of Strip Mining (OSM) - subjects who score in the lower quartile on the Strip Mining Attitude Scale.

Set of Materials - the bank of evidence developed, containing approximately 50 pieces of material in the form of documents, extracts from literature, photographs, slides, films, and tapes. Some materials project information; others are evidence of affective reactions to a social situation.

Hypotheses (Conceptual)

Hypothesis 1 - Subjects predetermined by SMAS as supporters of strip mining will, as a result of the application of the set of materials, move significantly toward a position of less support of strip mining.

Hypothesis 2 - Subjects predetermined by SMAS as opposers of strip mining will, as a result of the application of the set of materials, move significantly toward a position of less opposition to strip mining.

Hypothesis 3 - Control subjects predetermined by SMAS as supporters of strip mining and having no treatment on the topic will not move significantly to a position of greater support or less support for strip mining.

Hypothesis 4 - Control subjects predetermined by SMAS as opposers of strip mining and having no treatment on the topic will not move significantly to a position of greater opposition or less opposition to strip mining.

Hypotheses (Operational)

H_1 : $\bar{X}$ pre $>$ $\bar{X}$ post
(experimental supporters)
H_o : $\bar{X}$ pre $\leq$ $\bar{X}$ post

H_2 : $\bar{X}$ pre $<$ $\bar{X}$ post
(experimental opposers)
H_o : $\bar{X}$ pre $\geq$ $\bar{X}$ post

H_3 : $\bar{X}$ pre $=$ $\bar{X}$ post
(control supporters)
H_o : $\bar{X}$ pre $\neq$ $\bar{X}$ post

H_4 : $\bar{X}$ pre $=$ $\bar{X}$ post
(control opposers)
H_o : $\bar{X}$ pre $\neq$ $\bar{X}$ post

Outline of the Study

Chapter II constitutes a review of literature related to the development of the set of materials as well as the theoretical assumptions of the attitudinal changes hypothesized.

Included in Chapter III are three broad topics, all falling in the area of methodology. These topics are: 1) steps in the development of the set of materials, 2) the development of the attitudinal instrument, and 3) the design of the research related directly to the operational hypotheses.

Chapter IV analyzes the data collected and summarizes the results of the study. Also included in this chapter are the conclusions reached and recommendations, both for the use of this study and for further research.

CHAPTER II

REVIEW OF RELATED LITERATURE

The survey of literature related to this study was considered in two areas:

(1) Materials developed showing various sides of an issue, and

(2) Attitudinal change with respect to an environmental issue.

Material Development

With environmental problems becoming increasingly complex everyday, techniques must be devised which bring the vast quantity of information influencing any one issue to a level at which the student can weigh the factors involved, assess the alternatives for solution, and then establish his own position on the issue.

It is interesting to note that the major incentive for the study at hand came from literature not directly related to environmental education. The rationale for this study concurs with that of the Humanities Curriculum Project (12), which was undertaken in Great Britain.

In explaining the Project it is noted by Wringe (32) that:

> The particular task of the Humanities Curriculum Project is to develop an element of general education for 14 to 16 year-olds, especially those of average and less than average ability, and, in the light of general aims, to select a number of topics in terms of their relevance to those about to enter society as young adults, and to develop understanding of these in schools in such a way that pupils become committed to responsibility

> (the acceptance of one's own accountability) rather than to authority (depending for justification on others). Appropriate topics are held to be those which are by definition controversial in so far as they divide pupils, parents and teachers. It is precisely in these areas that acceptance of one's own accountability rather than the opinions of others is vital. Examples of such topics are war, education, the family, poverty, people at work, law and order.

The topics covered by the Project are social and cultural issues. The development of the set of materials in this study followed some of the same format, since it has been stated by Roth (24) that socio-cultural concepts are an integral part of environmental education.

With respect to the teacher's role in the Project's approach, Wringe (32) mentions that the teacher

> may not impart his opinions, nor comment on a pupil's point of view nor on the material presented. Three things are allowed: he may answer questions about the meaning of words or passages in the material if these are raised by a participant, he may ask questions to which he thinks he does not know the answers, and he may select in turn the pieces of evidence and their moment of introduction into the discussion.

With respect to organization, Wringe (32) continues:

> On each topic a bank of evidence is prepared. This contains as many as 150 pieces of material--historical documents, extracts from literature, photographs, films, tape recordings, and so on. Such materials are not only intended to present a set of empirical facts about a situation in a number of different formats. A poem may be evidence of an affective reaction, a photograph may show the dynamics of a social situation, didactic prose may show that a given point of view was once seriously held by someone.

The materials included are chosen because they represent a viewpoint toward the issue in question. The Project's director, Stenhouse (26), explains:

> What is meant by evidence is simply any kind of material or experience used, not simply for its own sake but in relevance to an issue. . .Anything can be used as evidence if it is used effectively to explore a problem.

Emphasizing the teacher's role he adds:

> Neutral chairmanships is not only a professional ethic in controversial matters but also the means to put responsibility on the pupils in the task of gaining understanding.

Wringe (32) questions the neutrality of the teacher, since the teacher is making the decision as to which data is introduced and when it is used. She doubts how appropriate neutral chairmanships are relative to the students' willingness to initiate discussions on subjects they may be ignorant of.

With the work of Humanities Curriculum Project as a base, other sources of materials research are noted.

Myers and Stitely (21), in surveying social studies materials which deal with environment-related topics, noted materials under several classifications. Included in these were general textbooks, supplemental inquiry books, project materials, and school system-developed materials. Generalizing, they state that:

> It appears that writers and publishers are more willing to deal with environmental issues and problems in inquiry books than they are in general texts. At least two

> factors seem to account for this. First, the inquiry approach excludes author judgments to a great degree and makes the treatment of controversy safer. Second, the topical organization permits clear focus on single contemporary matters without a need to provide general coverage or to tie topics to historical trends or general themes.

Among the materials discussed is the Inquiry into Crucial American Problems Series. Here editor Fraenkel (5) devotes two of the 16 volumes to the environment: "The Environmental Crisis" and "Population and Survival." The former contains 41 contrasting views or positions on environmental problems. These are expressed by environmentalists and others who have experienced environmental problems.

The Harvard Public Issues Series is a collection of 28 separate booklets to be used at the high school level. Within each booklet Oliver and Newmann (22) deal with a specific value conflict that exists. One of these booklets deals with the environmental issue of population control. Some of the other booklets touch on environmental issues but do so incidentally.

Another example of a set of supplementary books is the Opposing Viewpoints Series (23). One of the seven volumes, "The Ecology Controversy", deals with the environment. Myers and Stitely (21) note that it contains 16 readings of various viewpoints ranging from Pope Paul VI to Paul Erlich.

Lewenstein (17) calls for a need for teaching about controversial issues and mentions that the teacher's role should be that

of a neutral agent. Concurring, at least in general terms, Van Til (31) notes the

> social lag by the schools in educating Americans on the complex interrelationships between ecology and economics.

Knapp (15) offers environmental education as a vehicle for providing an experience which

> incorporates methods of problem identification and analysis, introduction of competing or conflicting "sides" of issues, the consideration of alternative appropriate actions for the solution of issues, and the examination of social or cultural causes of the issue situation.

Two additional studies with respect to materials are noted as they are classified as reviews of instructional materials for conservation education, a subset of environmental education. Johnson and Dambach (14) collected and evaluated free and inexpensive materials for use in conservation education. On the basis of judges' evaluation of a random sample of 1,541 pieces from the 7,524 pieces received, many conclusions were reached. Among them, Roth and Helgeson (25) note, were the following:

1. Bias (in topics covered) was at least as prevalent in governmental agency materials as it was in organization and industrial materials.
2. Only a fraction of the materials addressed to students was well oriented toward both curriculum and audience.
3. Only a small portion of the total materials was directed toward social studies. . .

Gwinn (9) conducted a study on elementary and secondary school

textbooks adopted by the State of California. His findings included:

1. Several of the textbooks, particularly science, dealt with man's ability to change and modify the environment but emphasized only the positive effects. Harmful consequences stemming from man's lack of understanding were omitted. The need for an integrated resource-use plan did not seem important to the textbook writers.
2. Emphasis was placed on the great technological strides in all aspects of our living: big buildings, big dams, big cities, big highways. Almost totally lacking were suggestions of problems resulting from bigness: pollution, transportation, waste, uniformity and vanishing beauty.
3. One misconception almost universally expressed was the idea that the abuse of natural resources was something of the past, with the implication that abuses are being corrected and that the future will be rosy. Recovery and restoration appeared to be unmentionable or unnecessary concepts.

Summarizing both studies, Roth and Helgeson (25) conclude that most materials were:

> inappropriate for both the intended audience and the treated content. Environmental concerns clearly require educational materials that deal with the interrelationships and with interactions of living things with the environment and which draw upon knowledge and understanding from all areas of the natural, physical, and social sciences.

Attitude Change

Once teachers and students have identified problems and issues with regard to the environment, the question then turns to how students' attitudes can be influenced. Without changes in attitude

a change in action is doubtful. Knapp (15) stated that research on attitudes about environmental issues has been rather limited and inconclusive. Most of the studies done have involved the attitudes of high school and college students and adults.

Swann (27) performed a study designed to develop and test instruments for determining attitudes toward air pollution. One hundred seventy-three high school seniors in Detroit, Michigan were subject to a forced-choice questionnaire which matched air pollution control with twelve other problems of the environment. Subjects were asked to choose the more important in each case. He concluded that air pollution was considered a relatively serious problem in Detroit.

George (7) designed a plan for determining whether knowledge and understanding resulted in a more favorable attitude toward conservation. A Likert-type attitude scale related to conservation was used to make 1,618 observations on high school students, college students, and adults. He found that attitudes toward conservation did change and, as Roth and Helgeson (25) note,

> the changes were associated with interest motivation, and exposure to conservation knowledge, and that significant attitude change could be identified and associated with the special conservation experience designed for each of the groups.

Hoover and Schultz (11) attempted to determine the difference in attitude toward conservation between science and non-science majors in certain colleges. Their rationale for such a study was based on

the fact that conservation education has customarily been handled through science programs. A Likert-type scale consisting of 92 items was used to measure student attitude on hypothetical situations. They conclude that the present science curricula had little effect on attitudes towards conservation. In addition, they state that the impact of college programs on changing basic attitudes was not significant.

Cohen (3) used a 75-item questionnaire which contained environmental information questions and attitude questions with 454 high school students from seven high schools. By using the scores from the environmental information section of this instrument he was able to designate a high content group and a low content group. Each group was then studied with respect to their responses to the attitude questions on the instrument. Cohen established a relationship between the two variables, showing the group with more environmental information was more consistent in each attitude response than the group with less environmental information, as they were randomly distributed in their selection of responses. Hollingsworth and Cohen (10), using the same data, designed a study to understand where students are in reference to their perceived attitude and knowledge concerning environmental issues. Among other conclusions they note there is a relationship between the information a student has and his willingness to express an opinion. The authors conclude by saying

> Future research needs to consider not only the source and intensity of environmental

> information, but the processing ability of students. Only in this manner can environmental education programs be designed which can help students understand the information about, and comprehend the range and complexity of, the environment.

Knapp (15) warned that the search for the one best way to change attitudes about the environment is doomed to failure, but a variety of methods must be developed. He emphasized that changing attitudes must not be a concern for only secondary school students but must begin at the elementary level.

> Better attitudinal measurement instruments are critically needed for elementary and secondary school students . . . The application of attitude research findings to environmental education programs is still in its infancy . . . Attitudes and values in environmental education hold the keys to the future of mankind and the quality of life on this planet.

With respect to the literature review several observations can be made:

1) Although some precise developments of materials sets on controversial issues have occurred, it appears that there is a definite need for this type of work in the direction of environmental issues, aimed at increasing critical thinking and student exploration of alternative solutions.
2) With so much information available, both factual information and propaganda, a method of compiling material must be developed so that students can discuss and debate topics

and, consequently have a broader base for their opinions and decisions.

3) Attitudinal scales need to be developed and used on environmental topics at all levels of age and understanding.

CHAPTER III

METHODOLOGY

Because this study had two purposes, two discussions are necessary. The first section deals only with the development of the set of materials and the second concentrates on the use of the set in researching the problem statement.

Part I - Development of the Set of Materials

The Panel of Judges

An early task in the development was the setting up of a panel of judges to review the materials submitted for possible inclusion into the set. The panel was comprised of seven educators, consisting of one administrator, three consultants from the areas of science education, environmental education, and career education, and three junior high school social studies teachers. The judges were selected partly on the basis of availability and partly because each is involved in education geared toward problem-solving processes.

(The panel had another task that is outlined in PART II.)

Upon receiving each individual piece of material each judge ranked it into what he felt was its place in a scale of five possible viewpoints or positions on the subject. The viewpoints ranged from "Strongly Supporting Strip Mining" to "Strongly Opposing Strip Mining." A neutral position was included at the midpoint of the scale. This enabled a judge the "Neutral" classification of, for

example, an article which he felt was showing both sides of the issue equally. (Instructions given to the judges are given in Appendix A.) It was stressed that the number chosen for a particular piece of material should reflect the position taken by the material and not the personal viewpoint about strip mining held by the panel member.

Criteria For Acceptance of Material

A piece of material was accepted into the set if no less than three of the seven judges concurred on a given viewpoint assignment. Also, the mean of the judges' assignments must have been no more than .5 units away from that given viewpoint. Also, material was deleted if two of the seven judges felt it to be too difficult for ninth grade students.

Collection of Materials

The collection of materials concentrated on printed materials, photographs, slides, films, and tapes, both audio and video. Altogether, 50 pieces of material were submitted to the judges for acceptance and ranking, or for deletion. A discussion of the results of their judging is included in Chapter IV.

Part II - Researching the Problem

Isaac (13) has stated that experimental research is designed to:

> Investigate possible cause and effect relationships by exposing one or more experimental groups to one or more treat-

> ment conditions and comparing the results to one or more control groups not receiving the treatment.

Based on Isaac's definition the research discussed in this part is classified as experimental research. The first section deals with the development of the attitudinal instrument and the second section deals with the sampling design, instrumentation, treatment, and statistical techniques used in the analysis of the data.

Developing the Strip Mining Attitude Scale (SMAS)

Since a scale for the measurement of attitude of junior high school students toward strip mining could not be found, one had to be developed.

Method of Construction. Guttman (8), Thurstone (28), and Likert (20) have developed three methods of construction of attitude scales. The researcher used the Likert method for the following reasons:

1. The Guttman scale is unidimensional, measuring one, and only one, attribute, according to Isaac (13).
2. The Thurstone method takes approximately twice as long to construct, as reported by Edwards and Kinney (4).
3. The reliabilities of scales constructed by the Likert method have been reported by Kretch, Crutchfield, and Ballachy (16) as being generally higher than those constructed by Thurstone's method.

Selection of Statements for the Initial Test Form. Statements were constructed by adapting statements from instruments developed by

Hollingsworth and Cohen (10), Milson (19), and Bourbon County Schools (1) or by writing original statements. Fifty statements were constructed and are given in Appendix B. Approximately half were stated with the intention of supporting strip mining and half were stated opposing strip mining. They were submitted to the panel of judges to classify as "supporting" or "opposing" strip mining. Statements were then deleted on the basis of one disagreement in judges' classification. This occurred in four of the fifty original statements.

Administration of the Initial Test Form. The remaining 46 statements were listed on the initial-test form. (These are given in Appendix C.) A six-part continuum, strongly agree, mostly agree, slightly agree, slightly disagree, mostly disagree, strongly disagree, was used as the method of response. The form was administered to 54 ninth grade students from a county school not the same as those involved in testing the hypotheses. The forms from this pilot test were scored by using arbitrary weights assigned to the responses. The "supporting" strip mining statements were scored from six (strongly agree), to one (strongly disagree), and the "opposing" strip mining statements were scored in the opposite direction. Therefore, the higher the score, the more support of strip mining, and the lower the score, the more opposition to strip mining. Murphy and Likert (20) report that this simple technique correlates from .987 to .995 with the more complicated method of converting sigma scores.

Selection of Statements for the Final Form. Murphy and Likert's (20) criteria for internal consistency were applied to the first and fourth quartiles of the distribution of scores. A weighted total (score times number checking that score) and a weighted mean (weighted total divided by the number of cases) was compiled for each statement. The difference between the means of the statements from the quartiles indicated the discriminatory power (DP) of each of the items. Those twenty statements with the highest DP's remained in the final form. The tabulations for these statements are summarized in Table 1. (The final form is given in Appendix D.)

TABLE 1

STATEMENTS WITH THE HIGHEST DP'S

Item Number	First Quartile Score	Fourth Quartile Score	First Quartile Mean	Fourth Quartile Mean	DP
2	43	15	3.31	1.15	2.16
[illegible]	46	23	3.54	1.77	1.77
[illegible]	53	27	4.08	2.08	2.00
6	58	33	4.46	2.54	1.92
7	70	30	5.38	2.31	3.07
10	53	30	4.08	2.31	1.77
13	35	14	2.69	1.08	1.61
14	59	19	4.54	1.46	3.08
15	42	19	3.23	1.46	1.77
18	66	46	5.08	3.54	1.54
20	63	25	4.85	1.92	2.93
24	56	23	4.31	1.77	2.54
27	53	33	4.08	2.54	1.54
29	48	27	3.69	2.08	1.61
30	47	27	3.62	2.08	1.54
31	46	17	3.54	1.31	2.23
33	50	16	3.85	1.23	2.62
35	57	19	4.38	1.46	2.92
38	54	19	4.15	1.46	2.69
50	50	24	3.85	1.85	2.00

Reliability of the Final Form. To determine the reliability of the final form of the SMAS the split-half method was used. The scale was divided into two halves by pairing statements with equal or nearly equal DP's. Table 2 gives the pairs contained in the half-tests. The Product-Moment Coefficient of Correlation was computed between the half-tests from the entire pilot sample and was found to be .86. Garrett (6) has suggested the use of Spearman-Brown prophecy formula as a method of determining the reliability of the complete instrument. This calculation was also made and yielded a reliability coefficient of .92. Murphy and Likert (20) have stated that a reliability coefficient of .90 is desirable on attitude measures.

TABLE 2

PAIRED STATEMENTS OF THE HALF-TESTS

Item Number	DP	Item Number	DP
14	3.08	7	3.07
20	2.93	35	2.92
38	2.69	33	2.62
24	2.54	31	2.23
2	2.16	4	2.00
50	2.00	6	1.92
3	1.77	10	1.77
15	1.77	13	1.61
29	1.61	18	1.54
27	1.54	30	1.54

Validity of the Final Form. The validity of the statements comprising the final form is discussed with respect to the method of selection of the statements.

1. Construct validity - the statements were written and adapted so that as many facets related to the issue of strip mining were covered, with approximately the same number of statements devoted to each.
2. Face validity - some of the statements were adapted from sources which classified them as "opposing" or "supporting" strip mining. To increase validity the statements were classified by persons knowledgeable in this area.

Design of the Study

The hypotheses have been stated conceptually in Chapter I. In H_1 and H_2 the independent variable is the application of the developed set of materials on strip mining. In H_3 and H_4 the lack of any treatment is the independent variable. The dependent variable in each is the students' attitude toward strip mining. To establish statistical inference a randomized control-group pretest-posttest design was used.

Selection of Subjects. In selecting a sample from the population of ninth grade students a random sampling method was used. From approximately 130 ninth grade Civics students attending Scott County Junior High (Scott County, Kentucky) a random sample of 60 students was drawn using a table of random numbers. These subjects were designated as the Experimental Group (EG). From the same number of

ninth grade students at Elkhorn Junior High (Franklin County, Kentucky) 60 students were randomly sampled and constituted the Control Group (CG).

Instrumentation (Pretest). Both the control group (CG) and the experimental group (EG) were given the SMAS as a pretest. For each group the upper and lower quartile scores were compiled and designated as the Supporters of Strip Mining (SSM) and the Opposers of Strip Mining (OSM), respectively.

Treatment and Posttesting. Next the EG took part in classes using the developed set of materials on strip mining. The researcher conducted the EG classes during the "Civics" period (55 minutes) for five consecutive school days. The choice of time used was based primarily on availability.

The researcher made an effort to make the students feel they were not in an experimental situation. Also, the EG had no indication of the expected results of the study. In other words, the students involved in these classes were not told that an attitude change was predicted and, even if they did suspect that one was expected, they had no idea which way they were expected to respond. This lack of information was intended to help control occurance of the Hawthorne effect, as outlined by Isaac (13).

During the treatment the researcher attempted to avoid letting his personal biases relative to the topic come forth. It should be noted that during two of the five day treatment the students were placed in a role-playing situation. The teacher drew lots to assign

five to six students to each of several different interest groups ranging from "The Strip Mine Operators Association" to "The Sierra Club". The students used one class period to establish their group's position on the issue and to collect information (from the set of materials) to justify their position. The following day each interest group gave a ten-minute presentation in an effort to substantiate their position. Knapp (15) states that counter-attitudinal role-playing is successful in changing attitudes in some people.

> After defending different positions, students sometimes change their attitudes because they have expanded their perception of the issue.

The CG did not have any treatment with respect to this topic. After completing the treatment on the EG, both the EG and the CG again completed the SMAS.

Statistical Tests. Before tests of significance were undertaken the means of the following groups were computed -- Pre-OSM-EG, Post-OSM-EG, Pre-SSM-EG, Post-SSM-EG, Pre-OSM-CG, Post-OSM-CG, Pre-SSM-CG, Post-SSM-CG.

Also, the means and standard deviations were calculated for the entire EG on both pretest and posttest scores and, likewise, for the entire CG. This was done to help obtain information with regard to the distribution of scores before and after treatment.

Next, the difference was calculated between the pretest and posttest means on the upper and lower quartiles of both the EG and

CG. These differences were each tested for significance through a t-test on correlated means. All were tested at the .05 level of significance. Discussion and tables on each test are given in Chapter IV.

CHAPTER IV

RESULTS AND CONCLUSIONS

This chapter sets forth and analyzes data secured in this study. It is organized into three major sections. The first section explains the outcome of the judges' acceptance and classification of material submitted. The second portion analyzes the data collected in testing the hypotheses and the results of the statistical tests of significance. Finally, conclusions are stated for the study and recommendations are made.

The Set of Materials

Of the 50 individual pieces of material submitted to the judges, 48 met the criteria for acceptance into the set. This final collection consisted of 27 articles or documents, 9 films, 4 slide-tape presentations, 2 posters, 2 video-taped television commercials, 2 slides with captions, and two printed cartoons.

On the basis of the judges' viewpoint assignments, the collection contained 14 individual materials that were rated as "Strongly supporting strip mining", and 6 that were rated "Mostly in support of strip mining". There were 5 individual materials that were rated "Neutral: taking a position of showing both sides equally; or undecided on a position". Also 5 were classified as "Mostly in opposition to strip mining" and 18 were rated "Strongly opposed to strip mining".

A complete resume' showing the final set of materials is given in Appendix E, where all of the materials are either reproduced or, where reproductions are impossible, an explanation or transcript is given. Also included in Appendix E are the viewpoint assignments of the judges, the mean of those assignment numbers, and the final viewpoint assignment for each piece of material.

The researcher also compiled a set of key sort cards, containing essentially the same information as given in Appendix E. This served as a cross reference for the purpose of finding suitable material quickly.

Testing the Hypotheses

The experimental group consisted of a random sample of 60 ninth grade students who received application of the set of materials on strip mining. The researcher utilized most materials included in the final set with one major expectation: only one of the nine films was available and/or feasible to rent during the period of time needed. Hypotheses 1 and 2 dealt with this experimental treatment, and dealt directly with the upper and lower quartile subjects, respectively, which were established by pretesting the experimental group. Before statistically testing the changes in the means of the upper and lower quartile scores, the means and standard deviations were calculated for the entire sample to show the distribution of scores on the pretest and the posttest. The mean of the pretest scores for the entire experimental group was 66.0 while the mean of

the posttest was 63.6. The pretest and posttest scores had standard deviations of 13.7 and 13.0, respectively. This slight change meant that scores were distributed similarly in both instances.

Hypothesis 1:

Those subjects in the experimental group scoring in the upper quartile of the pretest, and thus designated as "supporters," were scored in the posttest. The change in mean of these two sets of scores were subjected to a one-tailed t-test to see if the "supporters" had made a significant change to a position of less support for strip mining. This test of correlated scores, summarized in Table 3, shows that a significant change did occur, and occurred at the .01 level of significance. The experimental "supporters" moved from a mean of 81.9 to a mean of 72.7, yielded a t-ratio of 3.3, and rejected the null hypothesis. This indicated that application of the set of materials changed the attitude of the "supporters" to a position of less support for strip mining. The difference method of computing the t-ratio, as outlined by Van Dalen (30), was used:

$$t = \frac{M_1 - M_2}{\sqrt{\frac{\Sigma d^2}{N\ (N-1)}}}$$

where $\Sigma d^2 = \Sigma D^2 - \frac{(\Sigma D)^2}{N}$

TABLE 3

TEST OF SIGNIFICANCE ON SCORES OF EXPERIMENTAL "SUPPORTERS"
(N=15)

Pretest Scores X	Posttest Scores Y	D (Y-X)	D^2
77	81	- 4	16
78	83	- 5	25
78	74	4	16
79	79	0	0
79	67	12	144
80	44	36	1296
80	67	13	169
81	76	5	25
82	79	19	361
83	67	16	256
85	86	- 1	1
86	79	7	49
87	77	10	100
92	69	23	529
$\Sigma X = 1228$	$\Sigma Y = 1090$	$\Sigma D = 138$	$\Sigma D^2 = 2996$
$\bar{X} = 81.9$	$\bar{Y} = 72.7$		

$t = 3.3$; $df = 14$; $p < .01$ (one-tailed)

Hypothesis 2:

The experimental group subjects scoring in lower quartile on the pretest constituted the experimental "opposers" of strip mining. Posttest scores were compiled for the "opposers" and the means were calculated for both pretest and posttest scores. The mean moved from a 47.3 on the pretest to 52.0 on the posttest. This change, subjected to a one-tailed t-test, yielded a t-ratio of 2.72, also significant at the .01 level. This change was not as great as the change in the experimental "supporters". It is not unlikely that the

materials in the set were more effective in bringing about change in attitude toward opposition rather than support for strip mining. This conclusion requires further research. But the null hypothesis was again rejected, establishing a change in attitude to a position of less opposition to strip mining as a result of the application of the set of materials.

TABLE 4

TEST OF SIGNIFICANCE ON SCORES OF EXPERIMENTAL "OPPOSERS" (N=15)

Pretest Scores X	Posttest Scores Y	D (Y-X)	D^2
31	25	- 6	36
35	38	3	9
37	39	2	4
42	46	4	16
46	63	17	289
47	47	0	0
47	51	4	16
48	54	6	36
51	43	- 8	64
52	48	- 4	16
53	61	8	64
54	56	2	4
55	62	7	49
56	70	14	196
56	60	4	16
$\Sigma X = 710$	$\Sigma Y = 780$	$\Sigma D = 53$	$\Sigma D^2 = 815$
$\bar{X} = 47.3$	$\bar{Y} = 52$		

$t = 2.72$; 14 df; $p < .01$ (one-tailed)

The 60 students comprising the control group also received a pretesting and posttesting. From these scores for the entire control sample the pretest had a mean of 65 and a posttest mean of 64. Little change was also evident in the calculations of standard deviations for the pretest and posttest scores. These values of 17.2 and 17.4 indicated similar distribution of scores in both SMAS uses.

Hypothesis 3:

As with the experimental group, the pretest scores for the control group established "supporters" and "opposers" of strip mining, determined by the upper and lower quartile scores, respectively. But unlike the experimental group, the control sample received no treatment on the topic of strip mining during the week separating pretest and posttest.

The upper quartile scores from the control sample's pretest yielded a mean of 87.5 for the control "supporters". The posttest mean of the same subjects' scores was 85.9. The 1.6 difference in means was subjected to a two-tailed t-test of significance on correlated scores. The t-ratio, shown at the bottom of Table 5, was .92, not significant at the .05 level of significance. This indicated that subjects classified as "supporters" on the pretest and receiving no treatment tended to remain "supporters" and not move in the direction of either more or less support for strip mining.

TABLE 5

TEST OF SIGNIFICANCE ON SCORES OF
CONTROL "SUPPORTERS"
(N=15)

Pretest Scores X	Posttest Scores Y	D (Y-X)	D^2
79	81	- 2	4
80	84	- 4	16
81	74	7	49
82	80	2	4
84	73	11	121
85	81	4	16
86	89	- 3	9
87	87	0	0
88	84	- 4	16
89	94	- 3	9
90	84	6	36
93	94	- 1	1
94	95	- 1	1
94	92	2	4
101	98	3	9
$\Sigma X = 1313$	$\Sigma Y = 1288$	$\Sigma D = +39$	$\Sigma D^2 = 295$
$\bar{X} = 87.5$	$\bar{Y} = 85.9$		

t = .92; 14 df; p = NS

Hypothesis 4:

Control subjects predetermined as "opposers" to strip mining were those with scores falling in lower quartile of the SMAS pretest. As with other members of the control group, the control opposers received no treatment between pretest and posttest. The mean of the pretest scores of these "opposers" was 43.9 and the same subjects had a mean of 42.4 on their posttest scores. Table 6 gives these results, along with the two-tailed t-test on the difference of the means of 1.5. The t-ratio of .97 was also not significant at the .05 level.

TABLE 6

TEST OF SIGNIFICANCE ON SCORES OF
CONTROL "OPPOSERS"
(N=15)

Pretest Scores X	Posttest Scores Y	D (Y-X)	D^2
23	25	2	4
35	37	2	4
36	34	- 2	4
38	33	- 5	25
40	45	5	25
43	42	- 1	1
44	55	11	121
47	38	- 9	81
48	47	- 1	1
49	43	- 6	36
49	53	4	16
50	42	- 8	64
51	45	- 6	36
51	52	1	1
54	49	- 5	25
$\Sigma X = 658$	$\Sigma Y = 636$	$\Sigma D = -18$	$\Sigma D^2 = 344$
$\bar{X} = 43.9$	$\bar{Y} = 42.4$		

$t = .97$; 14 df ; p = NS

Both Hypotheses 3 and 4 were substantiated. Small changes did occur in both "opposers" and "supporters" mean scores. These insignificant changes were in the same directions as those hypothesized for the experimental group. It is likely that this small change occurred as a result of regression toward the mean of the entire control sample.

Conclusions

Hypotheses 1, 2, 3, 4 were all accepted based on the results of this study. From these results it can be concluded that:

1) When ninth grade students are exposed to various sides of an environmental issue changes in attitude occur. By seeing as many viewpoints as possible the students gained a more broadened outlook on the issue and this, in turn, gave them a larger base upon which to establish their own opinions.
2) The set of materials tended to change the attitudes of extreme scorers to points of view that were less extreme.
3) The set of materials was less effective in changing the attitude of "opposers" of strip mining that it was with "supporters" of strip mining. This suggests a reexamination of the materials in support of strip mining before using it again.
4) Although subjects receiving no treatment tended to regress slightly, their opinions and attitudes toward the issue did not change significantly without new information regarding the topic.

Recommendations

The results of this study support further use of this set of materials for teaching about the topic of strip mining. Some material may prove more effective than others but, overall, this approach in education in dealing with controversial issues has

proven valuable in not only providing information but, perhaps more importantly, in giving students a way of interacting and reaching their own conclusions. In using the set of materials on strip mining students seemed to be comfortable in disagreeing not only with the material but also with their peers. Students were also eager to assume role-playing situations in an effort to keep others aware of all sides of the issue. This technique should be utilized further in developing other sets of materials on controversial issues.

Future related research needs to be undertaken. In this study, the sample came from an area that is relatively untouched by strip mining. Students generally did not come from homes in which either strip mining directly supported the family or else caused a problem related to the family's way of life. This limited the ability to generalize about results, but it did point out the need for research comparing attitude change, through the use of materials such as the set generated for this study, with geographical location.

Since this research dealt primarily with subjects who scored in the extremes of the scale, a comparison of attitude change as a result of such exposure to materials should be made with a scale measuring dogmatism. In other words, what effect does the set have on highly dogmatic subjects? Results from such work would help to clarify which approaches are most effective with different individuals.

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APPENDIX A

Instructions for Ranking Materials

RANKING MATERIAL FOR THE SET OF MATERIALS

Directions to Judges:

View each piece of material separately. Your task is to determine the position being taken by the particular piece of material at hand with regard to strip mining. The scale below represents the set of possible viewpoints you may assign to the material:

NUMBER		VIEWPOINT
1	--	Strongly opposed to strip mining
2	--	Mostly in opposition to strip mining
3	--	Neutral; taking a position of showing both sides equally; undecided on a position
4	--	Mostly in support of strip mining
5	--	Strongly supporting strip mining

Remember, the number you assign to each piece of material should be the choice that you feel is most representative of the viewpoint of the material, and not your own personal viewpoint on the subject.

You may delete any piece of material that you feel would be too difficult for ninth grade students.

APPENDIX B

Statements Submitted to Judges

DIRECTIONS: Read each statement carefully. Then label each statement as to whether they support (label S) or oppose (label O) strip mining.

STRIP MINING ATTITUDE SCALE (SMAS)

Original Statements

_____ 1. The growth of our country will be retarded if we prohibit strip mining.

_____ 2. There is too much fuss over strip mining since we have plenty of land.

_____ 3. We need not be overly concerned with strip mining since science and technology will find solutions to any problems it may cause.

_____ 4. People interested in prohibiting strip mining tend to stand in the way of industrial progress.

_____ 5. The use of coal should be limited to assure an adequate supply for future generations.

_____ 6. Soil erosion is a minor problem in strip mining areas.

_____ 7. A man should be able to use his land as he sees fit, even if that includes strip mining.

_____ 8. The amount of privately owned land which is strip mined should be controlled by the government.

_____ 9. Man has moral responsibility for his environmental decisions.

_____ 10. Outdoor recreation areas are becoming harder to find, so strip mining should be permitted since old strip mines can be easily made into lakes and parks.

_____ 11. Since prohibiting strip mining would cause electric bills to skyrocket, then it should <u>not</u> be prohibited.

_____ 12. The individual land owner should be required to follow conservation practices.

_____ 13. Laws requiring strip-mining land to be put back in its original condition should be strengthened and strictly enforced.

____ 14. Since we have great need for energy, strip mining is all right.

____ 15. No individual or industry should be allowed to discharge many material into waterways that would lower the quality of the water.

____ 16. Strong forces are at work to restrict strip mining and cripple our economy.

____ 17. The terrible dangers of strip mining land in endangering the environment clearly outweigh the benefits in acquiring the coal at low cost.

____ 18. Strip mining is in the interest of the people since it is much safer than underground mining and lives are rarely lost.

____ 19. There are some areas that should never be stripped, since they are uniquely beautiful and could never be restored.

____ 20. During the energy crisis, strip mining regulations should be relaxed so that coal may be removed as cheaply as possible.

____ 21. Strip mining should be banned so that companies could give more attention to safer deep mine operations.

____ 22. The sooner we phase out strip mining the better off we will be.

____ 23. Strip mines are much cheaper to operate, so it should be favored by low and middle income citizens, since it makes their electric bills lower.

____ 24. Strip mining is less detrimental to the environment than is building roads, houses, and shopping centers.

____ 25. Any major stoppage of strip mining would bring about a coal shortage and increased inflation.

____ 26. Since strip mining provides coal to help meet our energy needs, it makes us less dependent on other countries.

____ 27. I would be willing to be taxed, if necessary, to make up for the difference in cost of strip mining and the more expensive deep mining.

____ 28. We should designate certain out-of-the-way areas for strip mining and not worry about reclamation.

____ 29. Although some wildlife will be threatened by strip mining, once the land is reclaimed it will actually support more wildlife.

____ 30. In many mountainous regions strip mining reclamation can make the land better than it was before stripping.

____ 31. Whether or not the government controls strip mining is of little concern to me.

____ 32. Environmentalists should oversee all strip mining operations.

____ 33. Many people are over-reacting to the problems caused by strip mining.

____ 34. The decisions about strip mining should be left to the people who live in the mining area.

____ 35. Since outdoor recreation is becoming an increasingly important part of our culture and economy, strip mining is important in producing areas that can be easily made into recreational facilities.

____ 36. Individual citizens should be stimulated to become well informed about strip mining issues, problems, and principles.

____ 37. I should make other people aware of the environmental problems associated with strip mining.

____ 38. The Tennessee Valley Authority was one of the first big conservation agencies and, since they use strip mined coal for producing our electricity, strip mining must be okay.

____ 39. If strip mining were outlawed, a power shortage would be created in which unemployment would increase and home life would be disrupted.

____ 40. Wherever reclamation cannot restore the land to its original condition, strip mining should not be permitted.

____ 41. The key to the good life is energy, and coal is energy.

____ 42. The energy "crisis" is a hoax, so this country does not need to strip mine in order to meet the nations energy demands.

____ 43. If you have strip mining, you can't have tourism, since nobody wants to see scalped hills and huge cancerous gashes on the mountain sides.

____ 44. Strip mining has destroyed the natural habitats for forest creatures throughout Appalachia.

____ 45. Acid runoff from stripping is impossible to control and this acid will kill most fish life.

____ 46. Strip mining causes erosion and erosion destroys natural fish beds.

____ 47. Stripping mountainous areas causes great damage to the people living in the valleys.

____ 48. Strip mining will eventually destroy all streams in the mining areas.

____ 49. Since streams are public property, strip mining actually damages property owned by all of us.

____ 50. Many conservationists opposed to strip mining are really socialists who don't believe in our free, capitalistic society.

APPENDIX C

Initial Test Form

NAME _____

STRIP MINING ATTITUDE SCALE
(Initial Form)

Blacken the zero under the symbol which represents the descriptive sentence which best describes your feelings about each statement; SA (Strongly Agree), MA (Mostly Agree), SLA (Slightly Agree), SLD (Slightly Disagree), MD (Mostly Disagree), SD (Strongly Disagree). Be sure to mark each statement.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	1.	The growth of our country will be retarded if we prohibit strip mining.
0	0	0	0	0	0	2.	There is too much fuss over strip mining since we have plenty of land.
0	0	0	0	0	0	3.	We need not be overly concerned with strip mining since science and technology will find solutions to any problems it may cause.
0	0	0	0	0	0	4.	People interested in prohibiting strip mining tend to stand in the way of industrial progress.
0	0	0	0	0	0	5.	The use of coal should be limited to assure an adequate supply for future generations.
0	0	0	0	0	0	6.	Soil erosion is a minor problem in strip mining areas.
0	0	0	0	0	0	7.	A man should be able to use his land as he sees fit, even if that includes strip mining.
0	0	0	0	0	0	8.	The amount of privately owned land which is strip mined should be controlled by the government.
0	0	0	0	0	0	9.	Man has moral responsibility for his environmental decisions.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	10.	Outdoor recreation areas are becoming harder to find, so strip mining should be permitted since old strip mines can be easily made into lakes and parks.
0	0	0	0	0	0	11.	Since prohibiting strip mining would cause electric bills to skyrocket, then it should not be prohibited.
0	0	0	0	0	0	12.	The individual land owner should be required to follow conservation practices.
0	0	0	0	0	0	13.	Laws requiring strip-mined land to be put back in its original condition should be strengthened and strictly enforced.
0	0	0	0	0	0	14.	Since we have great need for energy, strip mining is all right.
0	0	0	0	0	0	15.	No individual or industry should be allowed to discharge any material into waterways that would lower the quality of the water.
0	0	0	0	0	0	16.	Strong forces are at work to restrict strip mining and cripple our economy.
0	0	0	0	0	0	17.	The terrible dangers of strip mining land in endangering the environment clearly outweigh the benefits in acquiring the coal at low cost.
0	0	0	0	0	0	18.	Strip mining is in the interest of the people since it is much safer than underground mining and lives are rarely lost.
0	0	0	0	0	0	19.	There are some areas that should never be stripped, since they are uniquely beautiful and could never be restored.
0	0	0	0	0	0	20.	During the energy crisis, strip mining regulations should be relaxed so that coal may be removed as cheaply as possible.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	21.	Strip mining should be banned so that companies could give more attention to safer deep mine operations.
0	0	0	0	0	0	22.	The sooner we phase out strip mining the better off we will be.
0	0	0	0	0	0	23.	Strip mines are much cheaper to operate, so it should be favored by low and middle income citizens, since it makes their electric bills lower.
0	0	0	0	0	0	24.	Strip mining is less detrimental to the environment than is building roads, houses, and shopping centers.
0	0	0	0	0	0	25.	Any major stoppage of strip mining would bring about a coal shortage and increased inflation.
0	0	0	0	0	0	26.	Since strip mining provides coal to help meet our energy needs, it makes us less dependent on other countries.
0	0	0	0	0	0	27.	I would be willing to be taxed, if necessary, to make up for the difference in cost of strip mining and the more expensive deep mining.
0	0	0	0	0	0	28.	We should designate certain out-of-the-way areas for strip mining and not worry about reclamation.
0	0	0	0	0	0	29.	Although some wildlife will be threatened by strip mining, once the land is reclaimed it will actually support more wildlife.
0	0	0	0	0	0	30.	In many mountainous regions strip mine reclamation can make the land better than it was before stripping.
0	0	0	0	0	0	31.	Whether or not the government controls strip mining is of little concern to me.

SA	MA	SLA	SLD	MD	SD		
ɑ	0	0	0	0	0	32.	Environmentalists should oversee all strip mining operations.
ɑ	0	0	0	0	0	33.	Many people are over-reacting to the problems caused by strip mining.
ɑ	0	0	0	0	0	35.	Since outdoor recreation is becoming an increasingly important part of our culture and economy, strip mining is important in producing areas that can be easily made into recreational facilities.
ɑ	0	0	0	0	0	37.	I should make other people aware of the environmental problems associated with strip mining.
ɑ	0	0	0	0	0	38.	The Tennessee Valley Authority was one of the first big conservation agencies and, since they use strip mined coal for producing our electricity, strip mining must be okay.
ɑ	0	0	0	0	0	39.	If strip mining were outlawed, a power shortage would be created in which unemployment would increase and home life would be disrupted.
ɑ	0	0	0	0	0	40.	Wherever reclamation cannot restore the land to its original condition, strip mining should not be permitted.
ɑ	0	0	0	0	0	43.	If you have strip mining, you can't have tourism, since nobody wants to see scalped hills and huge cancerous gashes on the mountain sides.
0	0	0	0	0	0	44.	Strip mining has destroyed the natural habitats for forest creatures throughout Appalachia.
ɑ	0	0	0	0	0	45.	Acid runoff from stripping is impossible to control and this acid will kill most fish life.
ɑ	0	0	0	0	0	46.	Strip mining causes erosion and erosion destroys natural fish beds.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	47.	Stripping mountainous areas causes great damage to the people living in the valleys.
0	0	0	0	0	0	48.	Strip mining will eventually destroy all streams in the mining areas.
0	0	0	0	0	0	49.	Since streams are public property, strip mining actually damages property owned by all of us.
0	0	0	0	0	0	50.	Many conservationists opposed to strip mining are really socialists who don't believe in our free, capitalistic society.

APPENDIX D

Final Test Form

NAME _____

STRIP MINING ATTITUDE SCALE (SMAS)

Blacken the zero under the symbol which represents the descriptive sentence which best describes your feelings about each statement; SA (Strongly Agree), MA (Mostly Agree), SLA (Slightly Agree), SLD (Slightly Disagree), MD (Mostly Disagree), SD (Strongly Disagree). Be sure to mark each statement.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	1.	During the energy crisis, strip mining regulations should be relaxed so that coal may be removed as cheaply as possible.
0	0	0	0	0	0	2.	Although some wildlife will be threatened by strip mining, once the land is reclaimed it will actually support more wildlife.
0	0	0	0	0	0	3.	Laws requiring strip mined land to be put back in its original condition should be strengthened and strictly enforced.
0	0	0	0	0	0	4.	There is too much fuss over strip mining since we have plenty of land.
0	0	0	0	0	0	5.	People interested in prohibiting strip mining tend to stand in the way of progress.
0	0	0	0	0	0	6.	Soil erosion is a minor problem in strip mining areas.
0	0	0	0	0	0	7.	Outdoor recreation areas are becoming harder to find, so strip mining should be permitted since old strip mines can be easily made into parks and lakes.
0	0	0	0	0	0	8.	No individual or industry should be allowed to discharge any material into waterways that would lower the quality of the water.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	9.	Since we have great need for energy, strip mining is all right.
0	0	0	0	0	0	10.	A man should be able to use his land as he sees fit, even if that means strip mining.
0	0	0	0	0	0	11.	Strip mining is in the interest of the people since it is much safer than underground mining and lives are rarely lost.
0	0	0	0	0	0	12.	We need not be overly concerned with strip mining since science and technology will find solutions to any problems it may cause.
0	0	0	0	0	0	13.	I would be willing to be taxed, if necessary, to make up for the difference in cost of strip mining and the more expensive deep mining.
0	0	0	0	0	0	14.	In many mountainous regions strip mine reclamation can make the land better than it was before stripping.
0	0	0	0	0	0	15.	Whether or not the government controls strip mining is of little concern to me.
0	0	0	0	0	0	16.	Many people are over-reacting to the problems caused by strip mining.
0	0	0	0	0	0	17.	Since outdoor recreation is becoming an increasingly important part of our culture and economy, strip mining is important in producing areas that can be easily made into recreational facilities.
0	0	0	0	0	0	18.	Strip mining is less detrimental to the environment than is building roads, houses, and shopping centers.

SA	MA	SLA	SLD	MD	SD		
0	0	0	0	0	0	19.	The Tennessee Valley Authority was one of the first big conservation agencies and, since they use strip mined coal to produce our electricity, strip mining must be okay.
0	0	0	0	0	0	20.	Many conservationists opposed to strip mining are really socialists who don't believe in our free, capitalistic society.

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